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A Dollar Cost Comparison of Soviet and US Defense Activities, 1968-78

A Research Paper

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Introduction

The military establishments of the USSR and the United States are difficult to compare because they differ so much in missions, structure, and characteristics. Any common denominator used for comparative sizing is imperfect, and its limitations must be understood in interpreting such comparisons. The approach taken here is to compare the defense activities of the two countries in resource terms. The common denominator is dollar cost.

This paper presents estimates of what it would cost to produce and man in the United States a military force of the same size and with the same weapons inventory as that of the USSR and to operate that force as the Soviets do. It then compares these estimates with US defense outlays. This approach provides a general appreciation of the relative magnitudes of the defense activities of the two countries. Dollar cost data also provide a means of aggregating elements of each country's military program into comparable categories and thus can show trends and relationships between the two defense establishments that are difficult to discern and measure in other ways.

Definitions

The defense activities used in this comparison encompass the following:

- National security programs that in the United States would be funded by the Department of Defense.
- Defense-related nuclear programs such as those funded in the United States by the Department of Energy.
- Selective Service activities.
- The defense-related activities of the US Coast Guard and Soviet Border Guards.

The following activities are not included in this comparison:

- Military retirement pay, which reflects the cost of past rather than current military activities.
- Space activities that in the United States would be funded by NASA.
- Civil defense and military assistance programs, except for the pay and allowances of uniformed personnel engaged in such programs.
- Veterans' programs.
- Soviet Internal Security Troops (who essentially perform internal police functions).

US Data

US dollar cost data are in terms of outlays derived from the US budget and *The Five-Year Defense Program* issued by the Department of Defense in October 1978. The US data have been converted to calendar year terms, and defense-related activities of the Department of Energy and the Coast Guard have been added. The US figures in this report, therefore, do not match actual budget authorizations or appropriations.

Estimates of Soviet Defense Activities

The dollar costs of Soviet defense activities are developed for the most part on the basis of a detailed identification and listing of Soviet forces and their support. The components that make up these forces and their support are multiplied by estimates of what they would cost in the United States in dollars. The results are then aggregated by military mission and by resource category.

The reliability of the estimates depends on the precision and accuracy of our estimates of the Soviet activities and the cost factors applied to that data base. We believe that the dollar cost estimate for total defense activities is unlikely to be in error by more than 10 percent in the current period or by more than 15 percent in the late 1960s. This judgment, while aided by the use of statistical techniques, nonetheless contains a large subjective element. Moreover, the margin of error can be much wider for some of the individual items and categories. We are more confident in the higher levels of aggregation than in the lower ones. Within the lower levels, our confidence varies from category to category.

We place our highest confidence in the estimate of personnel costs, which comprises about 35 percent of the total estimated dollar cost of Soviet defense activities for the 1968-78 period. These manpower costs are obtained by applying US factors for pay and allowances to estimates of Soviet military manpower.

We also have substantial confidence in our estimate of total military investment, which represents about 30 percent of the estimated total dollar cost. The investment category includes procurement of weapons and equipment and construction of facilities. These dollar costs are based for the most part on detailed estimates of Soviet weapons production and characteristics that can be ascertained with reasonable confidence through intelligence methods.

While we are somewhat less confident in our estimates of operations and maintenance costs, which are about 20 percent of the total dollar estimate, we nonetheless regard these estimates as substantially improved over previous years.

The estimated dollar costs for Soviet research, development, testing, and evaluation (RDT&E), which are derived in the aggregate using a less certain methodology, should be regarded as significantly less reliable than those for either investment or operating. The level and trend of these estimates, however, are consistent with the judgment, made with high confidence, that the Soviet military RDT&E effort is large and growing.

Dollar Costs and Military Capabilities

US defense expenditures and our estimates of the dollar costs of Soviet defense activities are measures of the annual flows of resources devoted to defense. Such measures can be used to compare the overall magnitudes and trends of the defense activities of the two countries in terms of resource inputs. They have an important advantage over many of the other input measures—such as the numbers and types of weapons—in that they provide a common denominator which permits us to make aggregative comparisons. Dollar cost valuations can take into account differences in the technical characteristics of military hardware, the number and mix of weapons procured, manpower strengths, and the operating and training levels of the forces.

But dollar valuations are still input rather than output measures and—while obviously related to capability—should not be used alone as a definitive measure of the relative effectiveness of US and Soviet forces. Assessments of capability must also take into account strategic doctrine and battle scenarios; the tactical proficiency, readiness, and morale of the forces; the numbers and effectiveness of their weapons; logistic factors; and a host of other considerations.

Like the other input measures, dollar valuations are probably more instructive as general indicators of changes in the military capabilities of the forces over time than as indicators of the comparative capabilities of the forces. That is, trends in resource inputs (for example, costs of manpower, values of weapons inventories, and costs of operations and maintenance) generally suggest changes in the capabilities of the forces: growth in military inputs should result in growth in capability, while a decline in inputs usually results in stable or declining capabilities.

Dollar Costs and Soviet Perceptions

Estimated dollar costs do not measure actual Soviet defense expenditures or their burden on the Soviet economy. These questions are addressed by different analytical techniques that yield estimates of the ruble costs of Soviet military programs.

Similarly, dollar cost analysis does not reflect the Soviet view of the distribution of the USSR's defense effort. Neither the system of accounts nor the structuring of expenditures by military mission is the same for the Soviet Ministry of Defense and the US Department of Defense. In addition, the sharp differences between the relative prices of various defense activities in the United States and the USSR affect the distribution of defense expenditures significantly. How the Soviets view their own defense effort is best inferred from ruble, not dollar, estimates.¹

Price Base

The data presented here are expressed in constant dollars so that trends in cost estimates will reflect real changes in military forces and activities rather than the effects of inflation. This paper uses prices which represent the purchasing power of the dollar for defense goods and services at midyear 1978.

Dollar Cost Comparisons

Aggregate Defense Costs

For the 1968-78 period, the cumulative estimated dollar costs of Soviet defense activities exceeded US outlays by more than 10 percent. The trends of the defense activities of the two countries differed more markedly. Estimated in constant dollars, Soviet defense activities increased at an average annual rate of 3 percent. While growth rates fluctuated somewhat from year to year—reflecting primarily the phasing of major procurement programs for missiles, aircraft, and ships—the pattern was one of continuous growth throughout the period. Evidence on weapon systems currently in production and development, continuing capital construction at major defense industries plants, and the increasing costs of modern weapons indicates that the long-term growth trend in Soviet defense activities will probably continue into the 1980s.

In contrast, the trend in US defense outlays in constant dollars has been downward for most of the period. US

outlays declined continuously from the Vietnam peak of 1968 through 1976. They increased slightly in 1977 and grew by 3 percent in 1978 as increases in procurement and RDT&E offset the continuing declines in personnel costs.

As a result of these diverging trends, the estimated dollar cost of Soviet defense activities caught up with US defense outlays in 1971 and exceeded them by a widening margin until 1977. In 1978 the Soviet total was about \$146 billion, nearly 45 percent higher than the US outlay of \$102 billion.

If uniformed personnel costs are excluded from both sides, the estimated dollar costs of Soviet defense activities exceed US outlays in 1978 by about 25 percent but are approximately the same as US outlays for the 1968-78 period. If RDT&E costs (for which estimates are considerably less reliable than those for other activities) are subtracted from each side, the estimated Soviet dollar cost total is about 40 percent higher than the US total for 1978 and 10 percent higher for the period.

The Index Number Problem

Evaluating the defense activities of both countries in dollar terms introduces a basic measurement problem common to all international economic comparisons and known to economists as the index number problem. Because of this problem, a comparison will yield different results depending on which country's prices are used. Given different resource endowments and technologies, countries tend to use more of the resources that are relatively cheap—and less of those that are relatively expensive—for a given purpose. A comparison drawn in terms of the prices of one country thus tends to overstate the relative value of the activities of the other. This tendency is more pronounced the greater the disparity between the economies.

The degree of overstatement of Soviet defense activities relative to those of the United States inherent in the dollar cost comparison cannot be measured precisely. An appreciation of the magnitude of the index number problem can be obtained, however, by calculating the other extreme—that is, by computing the ratio of Soviet to US defense activities measured in

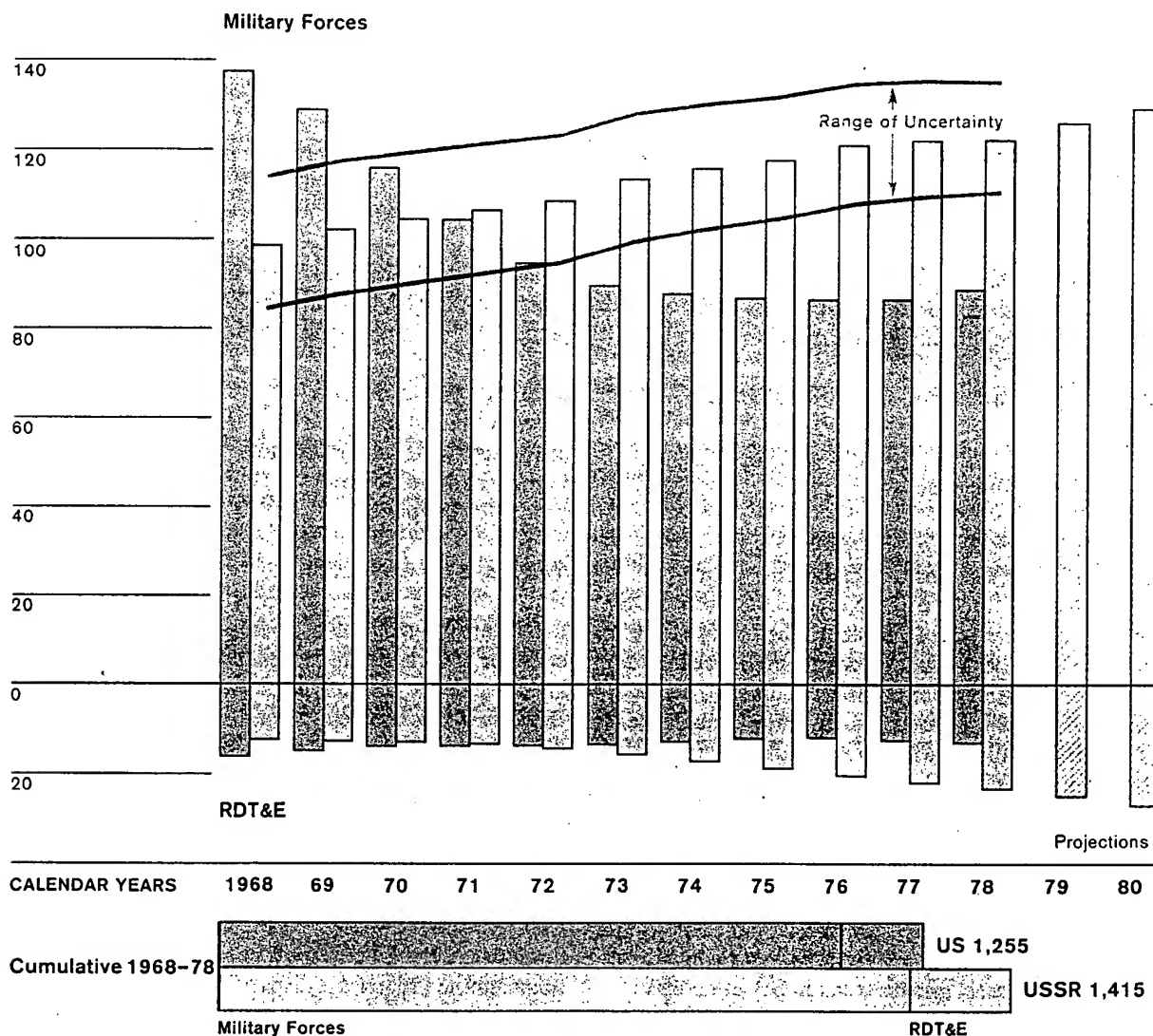
¹ For our latest estimate in ruble terms, see SR 78-10121, *Estimated Soviet Defense Spending: Trends and Prospects*, June 1978.

Total US and Soviet Defense Activities

FIGURE 1

A Comparison of US Outlays With Estimated Dollar Costs of Soviet Activities if Duplicated in the US

160 Billion 1978 Dollars



The dollar cost estimates reflect the cost of producing and manning in the US a military force of the same size and weapons inventory as the Soviet force and of operating that force as the Soviets do. The costs for military forces—investment and operating (less pensions)—are best estimates, with possible error margins displayed. The estimated costs of Soviet RDT&E are derived in the aggregate, using a less certain methodology. Because they provide only rough measures, they are shown separately from the dollar costs of military forces. The US defense costs are in terms of outlays based primarily on the Department of Defense Total Obligational Authority (TOA) in *The Five-Year Defense Program*, October 1978. The estimated dollar costs of projected Soviet defense activities for 1979 and 1980 are preliminary assessments subject to greater uncertainty than those for earlier years. Comparable US data were not available.

ruble cost terms, which overstates US activities relative to Soviet. A ruble cost comparison shows Soviet defense activities in 1978 to be about 25 percent larger than comparable US activities, whereas a dollar cost comparison shows them to be about 45 percent larger.

Economic Impact of Defense Activities

Although no single measure accurately describes the economic impact or burden of defense activities, defense spending as a share of GNP is often used for this purpose. This analysis uses each country's own prices to reflect relative scarcities and efficiencies in production. Measured in 1970 rubles and calculated at factor cost, the Soviet defense activities defined in our dollar cost estimates accounted for some 11 to 12 percent of Soviet GNP over the 1968-78 period. Defense activities in the United States in 1978 accounted for approximately 5 percent of total GNP.

Forces Opposite China

Both countries structure their forces not only for a major East-West war but also for other possible conflicts. For example, about 15 percent of the estimated dollar cost of Soviet defense activities is for forces that we believe have a primary mission against China. (Some of these forces probably could be used to meet other contingencies, however.) Similar analyses could be made of US outlays.

Military Mission Comparisons

US accounts array defense authorizations by the missions they are designed to support. The mission definitions in this paper follow the guidelines in the *Defense Planning and Programming Categories* (DPPC) issued by the Department of Defense in November 1978.

Strategic Forces. This mission includes all forces assigned to intercontinental and peripheral attack, strategic defense, and strategic command, control, and warning. Over the 1968-78 period, the level of Soviet activity for strategic forces (exclusive of RDT&E) measured in dollars was two and a half times that of the United States. Soviet activities showed a slight dip in the early 1970s with the completion of third-generation ICBM deployment programs, but rose sharply in the mid-1970s with the deployment of fourth-generation systems. US activities declined

steadily until 1976, when they began growing at a slow rate. As a result, in 1978 the Soviet level was about three times that of the United States.

Within the strategic forces mission, Soviet forces for intercontinental attack accounted for about 40 percent of the total dollar cost estimate for the period.² US outlays for intercontinental attack forces, while only two-thirds of the estimated dollar cost of the Soviet forces, accounted for slightly more than 60 percent of US strategic force outlays for the period.

Peripheral attack forces, for which the United States has no counterpart, accounted for about 15 percent of the total dollar cost of the Soviet strategic mission. (Peripheral attack forces include medium- and intermediate-range ballistic missiles, medium bombers, and some older ballistic missile submarines. These forces are assigned strategic targets on the periphery of the Soviet Union.)

The cost estimates for intercontinental attack forces reflect a substantial difference in the mix of weapons in the Soviet and US forces. During the period, ICBM forces accounted for 55 percent of the estimated dollar cost of Soviet intercontinental attack forces, compared with only about 20 percent of US outlays for this category. On the other hand, bomber forces represented about 40 percent of the US total for the category but accounted for less than 5 percent of the Soviet total.³ While the Soviets exceeded the US level of activities for ICBMs in every year of the period and that for ballistic missile submarines in all but one, US outlays for bombers were higher in every year.

² Because of differences in the US and Soviet price structures, the dollar cost shares presented here and below are not necessarily the same as those that would result from a ruble valuation of Soviet defense activities.

³ Backfire aircraft assigned to Long Range Aviation are included in peripheral attack forces, and those assigned to the Navy are included in general purpose forces.

US and Soviet Major Missions

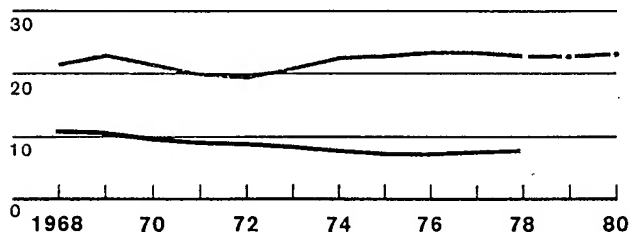
Dollar Cost of Soviet Activities
and US Defense Outlays

FIGURE 2

Strategic Forces

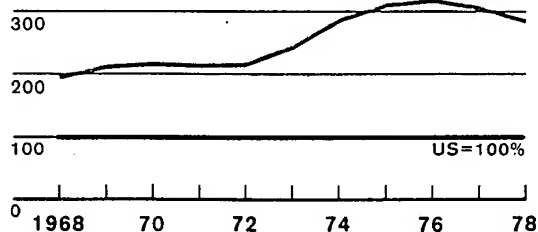
NOTE: Scales vary.

40 Billion 1978 Dollars



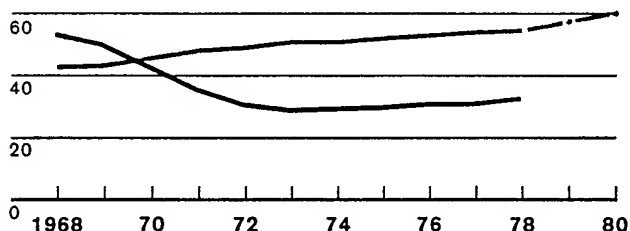
Dollar Cost of Soviet Activities
as a Percent of US Defense Outlays

400 Percent

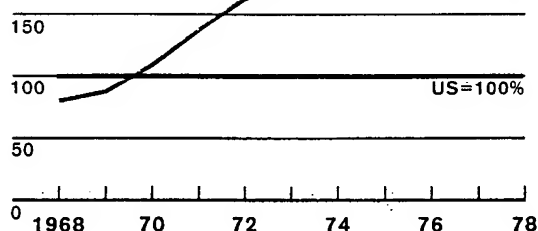


General Purpose Forces

80 Billion 1978 Dollars

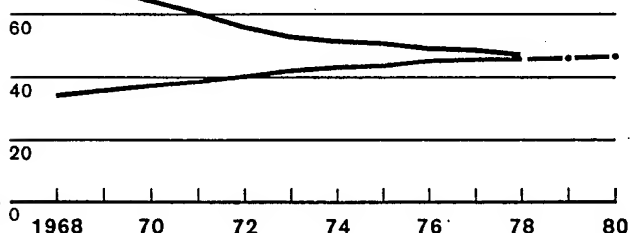


200 Percent

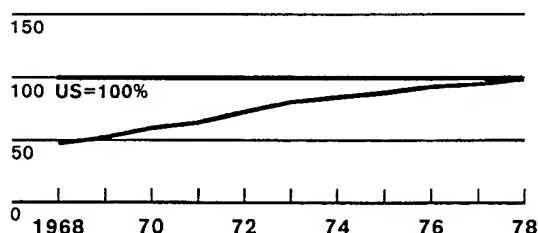


Support Forces

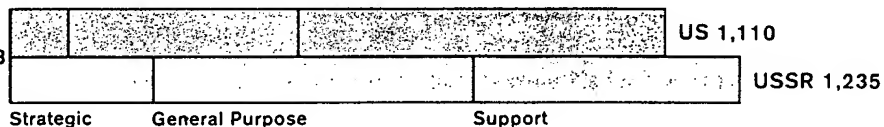
80 Billion 1978 Dollars



200 Percent



Cumulative 1968-78



These comparisons use US Defense Planning and Programming Categories of November 1978 with minor adjustments to attain comparability. Costs for pensions and RDT&E are excluded.

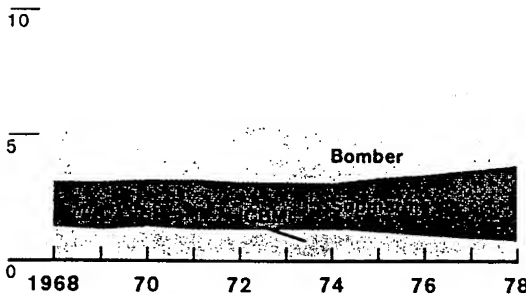
US and Soviet Forces for Strategic Offense

FIGURE 3

A Comparison of US Outlays With Estimated Dollar Costs of Soviet Activities if Duplicated in the US

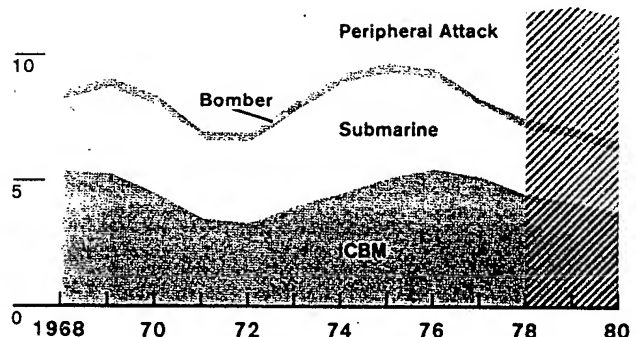
US

15 Billion 1978 Dollars



USSR

15 Billion 1978 Dollars



The strategic offense mission is defined according to the *US Defense Planning and Programming Categories* of November 1978 with minor adjustments to attain comparability. Costs for pensions, nuclear materials for warheads, and RDT&E are excluded.

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General Purpose Forces. This mission includes all land, tactical air, navy, and mobility (airlift and sealift) forces. Estimated dollar costs of Soviet activities for general purpose forces (exclusive of RDT&E) have exceeded comparable US outlays since 1970, and the gap widened every year until 1978. For the 1968-78 period, the Soviet total for this mission was about 35 percent higher than the US total.

Within both the Soviet and the US general purpose forces, land forces accounted for the largest share of the dollar cost. The estimated dollar cost of Soviet land forces increased steadily throughout the period. Outlays for US land forces fell sharply from the Vietnam peak in 1968 but have grown since 1975. In 1978 the Soviet level of activity for these forces, measured in dollar terms, was over two and a half times that of the United States.

The dollar costs of general purpose naval forces (excluding attack carriers and their associated air-

craft, which by DoD definition are included in tactical air forces) were relatively constant for both countries over the period. In 1978, estimated dollar costs of the Soviet activities were about 25 percent higher than US outlays, and over the 1968-78 period they exceeded US outlays for these forces by more than 10 percent. (If the costs of attack carriers and land- and sea-based Navy and Marine aircraft were included, US outlays would be about 15 percent higher than Soviet dollar costs in 1978 and 40 percent higher than the Soviet total for the entire period).

The US outlays for tactical air forces (including attack carriers and their associated aircraft) were twice the estimated dollar costs of comparable Soviet forces for the 1968-78 period. The trends for the two countries, however, were quite different. The US outlays fell steadily until 1974 but have grown moderately since then. Estimated Soviet activities grew at a very rapid rate (about 20 percent per year—more than any other mission) until 1972, indicating a considerable effort by the USSR to expand its tactical air force. After 1972

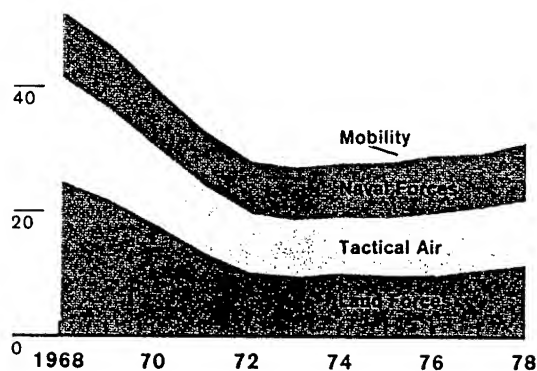
US and Soviet General Purpose Forces

FIGURE 4

A Comparison of US Outlays With Estimated Dollar Costs of Soviet Activities if Duplicated in the US

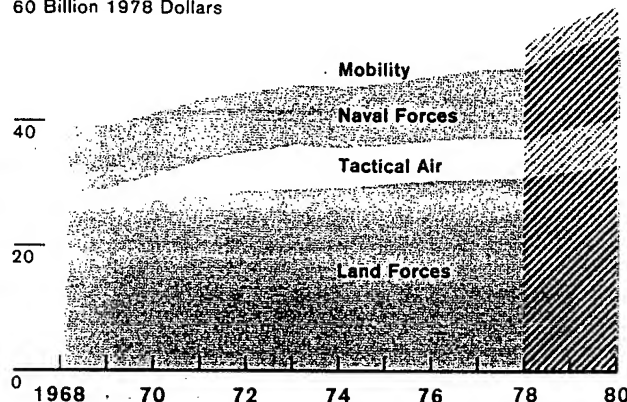
US

60 Billion 1978 Dollars



USSR

60 Billion 1978 Dollars



The general purpose mission is defined according to the *US Defense Planning and Programming Categories* of November 1978 with minor adjustments to attain comparability. Costs for pensions, nuclear materials for warheads, and RDT&E are excluded.

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the estimated dollar cost of Soviet tactical air forces stabilized at the new higher level until the last year of the period. A dip in 1978 reflected the completion of some major aircraft procurement programs. It does not appear to represent the start of a downward trend; we expect the introduction of new aircraft to raise procurement costs for 1979 and 1980. (If land- and sea-based Navy and Marine aircraft and attack carriers were excluded, US outlays would be only slightly higher than estimated Soviet dollar costs for 1978 and for the period as a whole.)

Support Forces. The support mission includes military space programs, the US Coast Guard, Soviet Border Guards, major headquarters, all logistic support activity, military personnel assigned to civil defense and military assistance programs, as well as all other activities normally considered support. Over the 1968-78 period the US level of support activities

exceeded that of the Soviet Union by approximately 35 percent when measured in dollar terms, but whereas the US level was more than twice the estimated Soviet level at the beginning of the period, it was only slightly greater at the end. Support activities comprised 50 percent of total US defense outlays and some 30 percent of the total estimated dollar cost of the USSR's defense activities for the entire period.

Resource Comparisons

Soviet and US defense activities can also be compared in terms of major resource categories: military investment, operating costs, and RDT&E costs.

- The investment category covers the dollar cost of activities to modernize or expand forces through the procurement of equipment, including major spare parts, and the construction of facilities. Investment costs represent the flow of equipment and facilities into the defense establishment. They are not an indication of the size of the force in any given year.

- Operating costs are those associated with maintaining current forces, including personnel costs. They are directly related to the size of the forces and to their level of activity.
- Dollar costs for RDT&E are those for activity devoted to exploring new technologies, developing advanced weapon systems, and improving existing systems.

Military Investment. The trends in military investment followed closely those for total defense costs in both countries over the 1968-78 period. The US investment figure fell continuously from 1968 until 1975 and then increased at a slow rate before jumping substantially in 1978. The Soviet investment estimate showed an upward trend but displayed cycles in annual growth rates that were related to the phasing of major procurement programs—especially those for missiles and aircraft. The estimated dollar cost of Soviet investment programs was fairly constant during the early 1970s, rose in the mid-1970s, and declined slightly in 1978. This dip occurred because several major procurement programs have ended or are nearing completion. New systems are expected to enter production in the next year or so, however, resulting in another cyclical increase.

The result of these trends is that the estimated dollar cost of Soviet military investment exceeded comparable US spending by about 80 percent in 1975-77 and by about 65 percent in 1978; for the entire period it was 30 percent higher.

Operating Costs. Measured in dollar terms, operating costs made up the largest share of the total defense costs for both countries.⁴ US outlays declined rapidly after 1968 until the mid-1970s, reflecting the scaling

⁴ This is true partly because relatively high US pay rates are used in estimating dollar operating costs for the USSR. If rubles are used instead of dollars, investment, not operating costs, constitutes the largest share.

down and eventual termination of the Vietnam involvement. Since that time, the increase in operations and maintenance costs have offset the continued decline of personnel costs so that operating costs as a whole have remained relatively constant. Estimated Soviet dollar costs in this category grew continuously during the period, reflecting growing force levels, and exceeded those of the United States by a widening margin after 1971. By 1978 they were 25 percent above comparable US outlays.

RDT & E. Estimates of the dollar cost of reproducing Soviet RDT&E activities are derived in the aggregate using a less certain methodology and are less reliable than the other estimates in this paper. Nonetheless, it is clear from the number and increasing complexity of the weapon systems that the Soviet activities were both large and growing during the period under review. US outlays for RDT&E, on the other hand, declined steadily over the period before turning up in 1977. As a result, Soviet RDT&E activities in 1978 were substantially larger than those of the United States.

Military Manpower

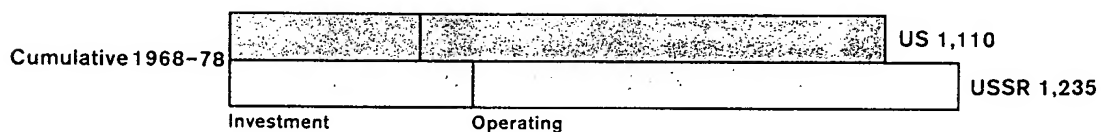
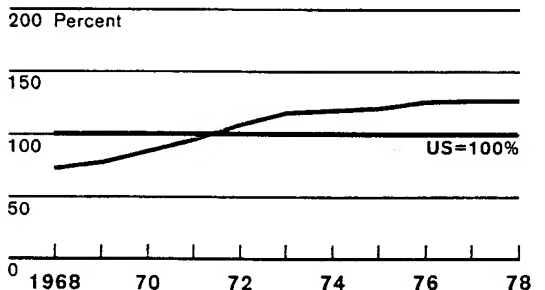
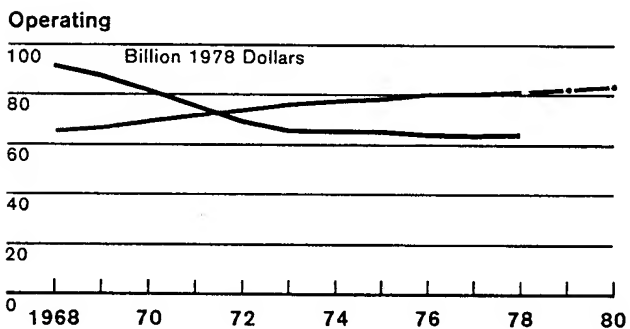
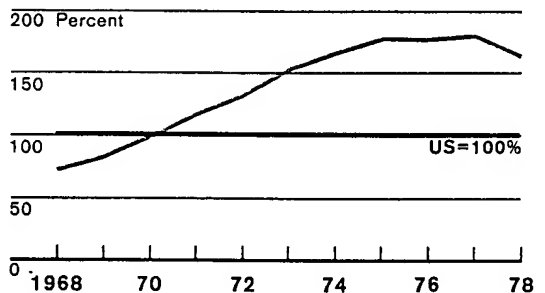
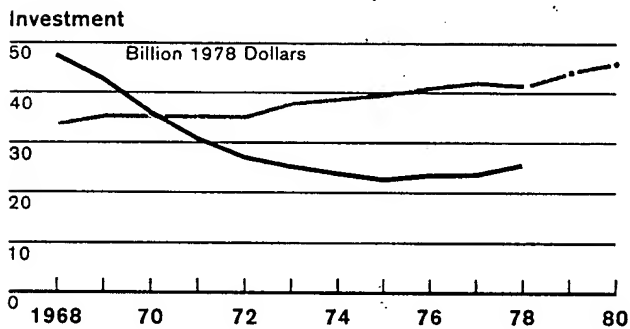
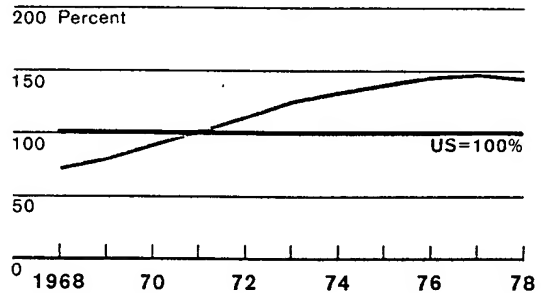
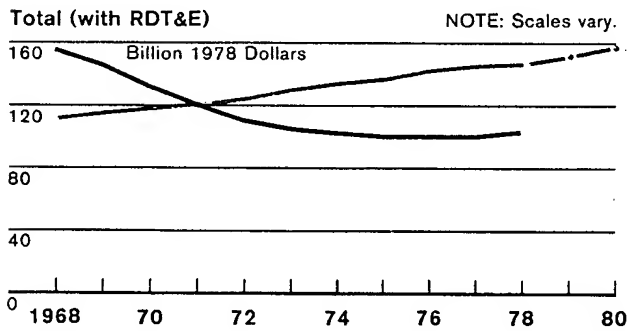
The Soviets historically have maintained a large standing force that has a broader range of responsibilities than does the US military. The uniformed personnel strength of Soviet forces in 1978 was estimated to be 4.3 million—about twice the US level. The Soviet figure includes the five armed services of the Ministry of Defense and the Soviet Border Guards, which is subordinate to the Committee for State Security but has some military responsibility. The half million men in the internal security forces of the Ministry of Internal Affairs and in railroad and construction troop units are not included in the comparison, because they do not fill what in the United States would be considered national security roles.

US and Soviet Defense Activities

FIGURE 5

Dollar Cost of Soviet Activities
and US Defense Outlays

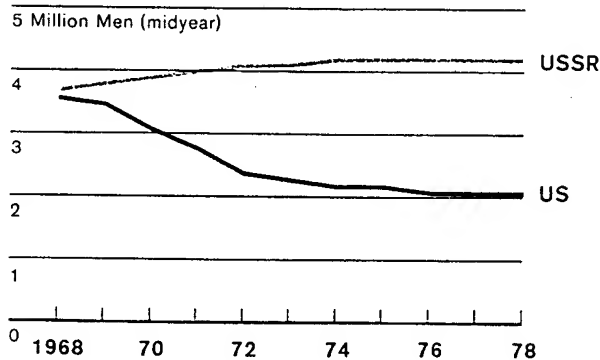
Dollar Cost of Soviet Activities
as a Percent of US Defense Outlays



Investment includes all costs for procurement of military hardware and the construction of facilities, but excludes RDT&E. Operating includes all personnel-related costs (with the exception of pensions) and all costs associated with the operation and maintenance of weapon systems and facilities.

US and Estimated Soviet Active Military Manpower

FIGURE 6



The USSR line excludes Internal Security Troops and construction troops—a total of about half a million men—who do not fill what in the US would be considered national security roles.

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Military manpower trends paralleled those for total costs in the two defense establishments. Estimated Soviet military manpower grew by more than 500,000 men between 1968 and 1978. The largest increase—nearly 300,000 men—occurred in the ground forces. The air forces experienced the greatest percentage growth, however, averaging nearly two and one-half percent per year over the 1968-78 period. These two services accounted for nearly 70 percent of the manpower increase. By contrast, the level of US military manpower has fallen steadily since the peak of the Vietnam buildup in 1968—from 3.6 million men to 2.1 million.

Comparison With Previous Estimates

Estimates of the dollar costs of Soviet defense activities are revised each year to take into account new information and new assessments of the size, composition, and technical characteristics of the Soviet forces and activities as well as improvements in costing methodologies. The US data used for comparative purposes are similarly revised each year to take into account changes in *The Five-Year Defense Program* and the *Defense Planning and Programming Categories*. Both the Soviet and US data are updated annually to reflect the most recent price base.

The net effect of this year's revisions is that in real terms the estimates for the period are slightly higher than those published last year. For example, the new estimate for 1977 is almost 4 percent higher. The major changes contributing to this increase were improved estimates of aircraft maintenance costs, an upward revision in our estimate of Soviet manpower, and an improved methodology for applying US pay rates to the Soviet force structure. This year's estimate for 1977 is about 12 percent higher than last year's estimate, reflecting, in addition to the real changes mentioned above, the effects of US price inflation.